

Appl. No. 10/676,585
Amdt. Dated January 10, 2006
Reply to Final Office action of October 12, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (withdrawn) A method comprising:
fabricating at least a thermoelectric film onto a bare wafer;
bonding backside of the bare wafer to an active wafer having at least a device; and
annealing the bonded bare and active wafers.
2. (withdrawn) The method of claim 1 wherein fabricating comprises:
fabricating the at least thermoelectric film made by an alloy comprising at least one of
bismuth (Bi), tellurium (Tc), antimony (Sb), lead (Pb), silicon (Si), germanium (Ge).
3. (withdrawn) The method of claim 2 wherein fabricating comprises:
fabricating the at least thermoelectric film made by the alloy, the alloy comprising one of
Bi and Tc, Sb and Tc, Zn and Sb, Tc, Ag, Ge, and Sb, and Pb and Te.
4. (withdrawn) The method of claim 2 wherein fabricating comprises:
fabricating the at least thermoelectric film made by the alloy, the alloy being one of
 Bi_2Te_3 , Sb_2Te_3 .
5. (withdrawn) The method of claim 1 wherein fabricating comprises:
fabricating the at least thermoelectric film at a location corresponding to a localized hot
spot on the active wafer.
6. (withdrawn) The method of claim 1 wherein bonding further comprises:
aligning the bare wafer to the active wafer.
7. (withdrawn) The method of claim 1 further comprising:
thinning at least one of the bare wafer and the active wafer before bonding.

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8. (withdrawn) The method of claim 1 further comprising:
coating the backside of the bare wafer with an interlayer to enhance bonding.
9. (withdrawn) The method of claim 1 wherein annealing comprises:
heating the bonded bare and active wafers at a temperature for a time period; and
cooling the bonded wafer.
10. (withdrawn) The method of claim 1 further comprising:
providing power signal to control at least thermoelectric film.
11. (currently amended) A wafer assembly comprising:
a bare wafer ~~having at least a thermoelectric film fabricated thereon, the bare wafer~~
having a backside; ~~and~~
an active wafer bonded to the bare wafer by the backside, the active wafer having at least
an active device; and
~~wherein the at least a thermoelectric film is on the bare wafer~~ located at a location
matched to an area on the active wafer that needs thermal control.
12. (original) The wafer assembly of claim 11 wherein the at least thermoelectric
film is made by an alloy comprising at least one of bismuth (Bi), tellurium (Te), antimony (Sb),
lead (Pb), silicon (Si), germanium (Ge).
13. (original) The wafer assembly of claim 12 wherein the alloy comprises one of Bi
and Te, Sb and Te, Te, Si, Ge, and Sb, and Pb and Te.
14. (original) The wafer assembly of claim 12 wherein the alloy is one of Bi_2Te_3 ,
 Sb_2Te_3 , and Zn_4Sb_3 .
15. (original) The wafer assembly of claim 11 wherein the at least thermoelectric
film is fabricated at a location corresponding to a localized hot spot on the active wafer.

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16. (original) The wafer assembly of claim 11 wherein the active wafer is bonded to the bare wafer in alignment.

17. (original) The wafer assembly of claim 11 wherein at least one of the bare wafer and the active wafer is thinned.

18. (original) The wafer assembly of claim 11 further comprising an interlayer coated at the backside of the bare wafer to enhance bonding.

19. (original) The wafer assembly of claim 11 wherein the bonded bare and active wafers is annealed by being heated at a temperature for a time period and cooled from the temperature.

20. (original) The wafer assembly of claim 11 wherein the bare wafer has power signal to control the at least thermoelectric film.

21. (previously presented) A die assembly comprising:
a die having an active device;
a substrate bonded to the die; and
at least a thermoelectric film fabricated on the substrate to remove heat from the die when the active device is powered, the at least thermoelectric film being located at a location matched to an area that needs thermal control.

22. (original) The die assembly of claim 21 wherein the at least thermoelectric film is made by an alloy comprising at least one of bismuth (Bi), tellurium (Te), cesium (Cs), zinc (Zn), antimony (Sb), lead (Pb), silver (Ag), germanium (Ge).

23. (original) The die assembly of claim 22 wherein the alloy comprises one of Bi and Te, Sb and Te, Zn and Sb, Te, Ag, Ge, and Sb, and Pb and Te.

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24. (original) The die assembly of claim 22 wherein the alloy is one of Bi_2Te_3 , Sb_2Te_3 , and Zn_4Sb_3 .

25. (original) The die assembly of claim 21 wherein the at least thermoelectric film is fabricated at a location corresponding to a localized hot spot on the active device.

26. (original) The die assembly of claim 21 further comprising an interlayer coated at the substrate to enhance bonding.

27. (previously presented) The wafer assembly of claim 11 wherein the at least thermoelectric film is selectively turned on or off by a power controller.

28. (previously presented) The die assembly of claim 21 wherein the at least thermoelectric film is selectively turned on or off by a power controller.